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STATEMENT OF WORK
FOR REMEDIAL DESIGN AND REMEDIAL ACTION
AT
ALBION-SHERIDAN TOWNSHIP LANDFILL SITE
CALHOUN COUNTY, MICHIGAN

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I. PURPOSE

The purpose of this Statement of Work (SOW) is to set forth requirements for implementation of the remedial action set forth in the Record of Decision (ROD), which was signed by the Regional Administrator of U.S. EPA Region V on March 28, 1995, for the Albion-Sheridan Township Landfill Site (Site). The Respondents shall follow the ROD, the SOW, the approved Remedial Design Work Plan, the approved Remedial Action Work Plan, U.S. EPA Superfund Remedial Design and Remedial Action Guidance and any additional guidance provided by U.S. EPA in submitting deliverables for designing and implementing the remedial action at the Albion-Sheridan Township Landfill Site.

II. DESCRIPTION OF THE REMEDIAL ACTION/PERFORMANCE STANDARDS

Respondents shall design and implement the Remedial Action to meet the performance standards and specifications set forth in the ROD and this SOW. Performance standards shall include cleanup standards, standards of control, quality criteria and other substantive requirements, criteria or limitations including all Applicable or Relevant and Appropriate Requirements (ARARs) set forth in the ROD, SOW and/or unilateral Administrative Order (UAO).

1. Site Security

The Respondents shall install and maintain a permanent fence at the Site to prevent access and vandalism to the Site. The fencing of the Site shall consist of a chain link fence around the perimeter of the landfill which is a minimum six-feet high with a minimum three-strand barbed wire. The fence shall encompass at a minimum the landfill waste as shown in Figure 1 of the ROD, except for waste consolidation as required in the ROD. Warning signs shall be posted at 200-foot intervals along the fence and at all gates. The warning signs shall advise that the area is hazardous due to chemicals in the soils which pose a risk to public health through direct contact with soils. The signs shall also provide a telephone number to call for further information. The permanent fence shall be completed within 30 days of the completion of the landfill cap.

2. Restrictive Covenants/Deed Restrictions

Within 60 days after the effective date of this UAO, Respondents shall use best efforts to execute and record with the Calhoun County recorder the restrictive covenants to prohibit future development (including, but not limited to, on-site excavations, construction and drilling) of the Site.

In addition, within 30 days after approval of the Pre-design Studies Report, Respondents shall use best efforts to implement institutional controls in the form of deed restrictions or local

ordinance to prohibit the installation of any groundwater drinking water well which draws water from the area shown in Figure 4 of the ROD to contain 2 ug/l arsenic or more.

All restrictions regarding future development of the Landfill shall be considered permanent, while U.S. EPA may advise lifting the restrictions regarding the future installations of groundwater drinking water wells when the arsenic levels within the groundwater in the area noted above remain for two years below the MCL.

3. Excavation and Disposal of Drummed Waste

The Respondents shall excavate the test pit area designated TP09 on Figure 5 of the ROD to uncover all drums, as specified in the ROD. Drums found to contain solid or liquid wastes which are structurally sound enough to remove with wastes intact, as determined by U.S. EPA, shall be removed to the staging area for characterization. In addition, all other structurally sound drums containing solid or liquid wastes encountered during consolidation or site preparation shall be removed to the staging area for characterization. Where practical, Respondents shall also remove liquid wastes from structurally unsound drums encountered at TP09 or during consolidation or site preparation and transport it to the staging area for characterization. Respondents shall overpack, as necessary, all excavated drums showing signs of degradation. Respondents shall include all overpacked drums excavated by the MDNR during test pitting, which are temporarily secured on the surface of the landfill, with other excavated drums for characterization and disposal. Respondents shall sample and analyze excavated drum contents for RCRA characterization and dispose off-site, as specified in the ROD, all liquid wastes and those solid wastes found to contain constituents in concentrations exceeding land disposal restrictions, or constituents for which incineration or stabilization as a treatment method is prescribed. Respondents may incorporate those drums containing solid wastes which do not trigger land disposal restrictions under the landfill cap.

4. Construction, Installation, and Maintenance of Landfill Cap

The Respondents shall design and construct an on-site landfill cap that meets or exceeds the substantive requirements of RCRA Subtitle D (40 CFR Part 241) and any more stringent requirements of Part 115 of the Natural Resources and Environmental Protection Act, 1994 PA 451 (Act 451 Part 115) (formerly known as the Michigan Solid Waste Management Act or Act 641) which are applicable or relevant and appropriate to the Site, as determined by U.S. EPA. Respondents shall cap the entire landfill waste mass shown on Figure 1 of the ROD, including site preparation and layout to re-route surface water drainage away from the capped area. Respondents shall consolidate waste on the east edge of the landfill as specified on page 24 of the ROD. Also as specified on page 24 of the ROD,

Respondents shall either consolidate wastes along the south edge of the landfill or acquire the property as specified in the ROD. As specified in the ROD, if the property is acquired, no consolidation of wastes along the south edge is necessary.

Respondents shall grade the landfill to attain grades and slopes required to facilitate drainage and to meet ARARs. Respondents may regrade the landfill as necessary to achieve sub-cap contours approved in the Remedial Design (RD). Respondents may only use off-site materials for fill if those materials are approved by U.S. EPA, in consultation with MDNR, prior to use.

The Respondents shall cover the landfill with a cap constructed, at a minimum, of a gas collection layer, a flexible membrane liner, a drainage layer, cover soil, and topsoil, as specified in the ROD. Respondents shall use cap materials, layer dimensions, and other characteristics as specified in the ROD. Respondents shall perform pre-design studies to determine the short-term and long-term costs and practicability of seeding the vegetative soil layer with native species (59 FR 43122). If U.S. EPA determines that it is practical and the same or less cost than traditional species, native species shall be used by the Respondents.

Prior to construction of the landfill cap, Respondents shall pull casing and seal with grout monitoring wells LF01, LF02, and LF03, which were drilled to the base of the landfill (see Figure 2 of ROD). Prior to the pre-final construction inspection, Respondents shall close and abandon monitoring wells MW-West, MW-South and MW-East (see Figure 8 of Remedial Investigation Report), which were installed prior to U.S. EPA's investigation and cannot be used for reliable sampling. Respondents shall perform this closure and abandonment in accordance with Michigan Act 315 of 1969, The Mineral Well Act.

Respondents shall construct an active landfill gas collection system in a grid network throughout the landfill and shall construct a blower/flare facility to treat the collected gas, as specified on page 25 of the ROD, unless U.S. EPA, in consultation with MDNR, determines that a passive venting system meets requirements of the Clean Air Act, Michigan Act 451 Part 115 and Part 55 of the Natural Resources and Environmental Protection Act, 1994 PA 451 (Act 451 Part 55) (formerly known as the Michigan Air Pollution Control Act or Act 348) standards without treatment. The gas collection or venting wells shall be constructed to collect gas from the entire area and depth of the landfill.

5. Installation and Operation of Monitoring Program for Remedial Action

Respondents shall implement groundwater and air monitoring programs to evaluate and ensure that the construction and implementation of

the Remedial Action comply with approved plans and design documents and performance standards. Respondents shall submit monitoring programs as part of the Remedial Design Work Plan (RD Work Plan), which shall address the specific components of the remedial action listed below. Groundwater and air monitoring samples shall be analyzed for the parameters included in this SOW or for the parameters required and approved by U.S. EPA in the RD.

A. Groundwater Monitoring

The Respondents shall implement a groundwater monitoring program as identified in the RD Work Plan or as required by U.S. EPA. The Respondents shall design the groundwater monitoring program to detect changes in the chemical concentration of the groundwater at and adjacent to the site. After construction of the landfill, Respondents shall monitor groundwater as specified below for at least five years following attainment of the performance standard for arsenic. The groundwater monitoring program shall include, but not be limited to:

(1) Quarterly sampling of wells identified in Table 1, below, for arsenic, ammonia, pH, Eh, dissolved oxygen and any other parameters identified in the approved RD.

(2) Quarterly sampling of drinking water wells RW02, RW04, RW05, RW06, RW07, RW08, and RW10 as identified in Figure 10 of the RI Report, for all constituents sampled at residential wells during the RI and any other parameters identified in the approved RD;

(3) Annual sampling of all wells identified in Table 1, below, for arsenic, ammonia, pH, Eh, dissolved oxygen, aluminum, antimony, benzene, cobalt, 1,2-Dibromo-3-chloropropane, manganese, nickel, and vinyl chloride (i.e., constituents previously found above Michigan Act 307 Type B levels in groundwater at the site), and any other parameters identified in the approved RD;

(4) Measurement of the ground water elevation whenever a monitoring well is sampled, to confirm groundwater flow directions at the site.

Within the schedule established in the RD Work Plan, Respondents shall install four new monitoring wells at the locations specified on page 26 of the ROD. Respondents shall vertically sample each of the new monitoring wells, in accordance with current MDNR guidance. During Pre-design Studies, Respondents shall also record the water levels of all existing and new monitoring wells and sample all existing and new monitoring wells for target compound list (TCL) organics, target analyte list (TAL) inorganics, and 1,2-dibromo-3-chloropropane. Respondents shall conduct all analyses using methods which will achieve method detection limits equal to or less

than the MCL for each compound or analyte, for those which have an MCL.

Between 50 and 52 months after approval of the Final Design, Respondents shall sample the wells listed in Table 1 for target compound list (TCL) organics, target analyte list (TAL) inorganics, and 1,2-dibromo-3-chloropropane, to assist U.S. EPA in meeting the requirements of Section 121(c) of CERCLA for the first five-year review of the site.

If additional information indicates that the groundwater monitoring program is inadequate, U.S. EPA may require additional groundwater monitoring wells and laboratory analysis of additional parameters. Monitoring wells designated for sampling are noted below. (See RI Report for monitoring well locations).

TABLE 1

MONITORING WELL	FREQUENCY
Shallow Glacial Wells	
MW02SG (background)	annual
MW04SG(WB)	annual
MW05SG (background)	annual
MW07SG	annual
MW09SG	annual
MW10SG	annual
Shallow Bedrock Wells	
MW04SB2	quarterly
MW06SB	quarterly
MW08SB	quarterly
MW09SB	quarterly
MW02SB (background)	quarterly
MW05SB (background)	quarterly
MW07SB	annual
MW15SB (new well)	annual
MW16SB (new well)	annual
MW02SB	annual
Deep Bedrock Wells	
MW09DB (new well)	annual
MW16DB (new well)	annual

B. Air Monitoring

The Respondents shall implement an air monitoring program as identified in the RD Work Plan or as required by U.S. EPA. The Respondents shall design the air monitoring program to detect air emissions from the landfill during and after construction of the landfill. Respondents shall monitor air for the constituents and

at the locations and frequency specified in the approved RD. At all times during construction and during all other phases of the Remedial Action, Respondents shall ensure that air emissions do not exceed a cumulative cancer risk of 10^{-6} at the landfill fenceline, using risk calculation methods set forth in Risk Assessment Guidance for Superfund. In addition, the air emissions shall not exceed any ARARs, including, but not limited to, the Michigan Act 451 Part 55, if applicable, and the federal Clean Air Act. If air emissions exceed these levels, Respondents shall take corrective measures as developed in the RD.

C. Points of Compliance

In order to monitor and evaluate the remedial actions throughout the Site, certain locations at which there are groundwater monitoring wells shall be selected as points of compliance, pursuant to Task 8 (Performance Monitoring) of the SOW. Wells designated as the Points of Compliance and which shall be sampled are identified in Table 1 of this SOW. All these wells shall be considered as groundwater points of compliance. If any of the wells are destroyed or in any way becomes unusable, the Respondents shall repair or replace each well, unless EPA determines that repair or replacement is not necessary. EPA may designate as points of compliance, additional wells required by the RD Work Plan and the Operation and Maintenance (O&M) Plan. The location of any additional wells installed pursuant to the UAO or this SOW shall be approved by the U.S. EPA.

Points of Compliance for the monitoring and evaluation of the landfill gas collection and flaring shall be addressed in the O&M Plan.

6. Installation and Operation of Contingent Remedy for Groundwater Treatment

A. Implementation of Contingent Remedy

Five years from the date on which construction of the landfill cap is complete, Respondents shall submit to U.S. EPA the results of a statistical test, described in the ROD and in Section III, Task 6 of this SOW, on wells in which the arsenic concentration has exceeded 0.05 mg/l at any time during the monitoring period (currently only MW06SB). From the results of this statistical test, U.S. EPA, in consultation with MDNR, will determine whether arsenic is declining sufficiently fast to fall below 0.05 mg/l within 15 years of completion of the landfill cap. If U.S. EPA determines that any well fails this test, Respondents shall write a Work Plan, conduct pilot testing, design and install a system for in-situ oxidation of groundwater to restore groundwater to the performance standard. The Respondents shall operate the groundwater treatment system until the groundwater performance standard is met at each of the wells listed in Table 1 and any

additional wells designated for performance monitoring in the Final Design for Groundwater Treatment. The groundwater performance standard is 0.05 mg/l arsenic (the MCL).

In accordance with the ROD, Respondents shall also implement this contingent remedy if at any time U.S. EPA determines that the groundwater plume affected by the landfill threatens to raise a residential well which existed on the day the ROD was signed, above 0.05 mg/l arsenic (the MCL).

If the contingent remedy is invoked by U.S. EPA, Respondents shall install and operate an in-situ groundwater treatment system as described on page 27 of the ROD and shown in Figure 7 of the ROD. The treatment system shall consist of a network of wells designed to increase oxidation of all contaminated groundwater that exceeds the MCL for arsenic, in order to increase precipitation of arsenic from the groundwater.

If U.S. EPA determines that no well fails the statistical test in Task 6 of this SOW and that the groundwater plume does not threaten any residential wells, Respondents are not required to implement groundwater treatment. In this case, Respondents shall continue groundwater monitoring for at least five years following attainment of the performance standard for arsenic at all points of compliance.

B. Pilot Testing

If U.S. EPA requires the contingent remedy, Respondents shall pilot-test the in-situ groundwater treatment system, as specified on page 27 of the ROD, to determine whether air or another oxidant is most suitable for the site and to assist with design of the system. Tasks, test and analysis methods, and work schedule for the pilot testing shall be as specified in the approved Work Plan for Groundwater Treatment.

C. Performance Monitoring and Termination

The Respondents shall monitor the system's performance on a regular basis, to assess the progress of groundwater remediation and to verify that the impacted groundwater does not migrate beyond the range of influence of the treatment system, as specified in the Final Design for Groundwater Treatment. At a minimum, performance monitoring shall consist of each of the elements of groundwater monitoring listed under Section 5(a) of this SOW.

The Respondents shall continuously operate the groundwater treatment system until a petition to cease operation is approved in writing by the U.S. EPA, after opportunity for comment by the MDNR. Any petition to cease operation shall include documentation showing that the groundwater performance standard has been continuously achieved for at least 24 months during operation of the system and

for an additional period of at least 2 months following a temporary shutdown of the treatment system as described in the paragraph below. During the 24-month period, Respondents shall collect groundwater samples on a quarterly basis from all monitor wells (i.e., at least 8 samples from each compliance point). Samples collected during this 24-month period shall be analyzed for arsenic, ammonia, pH, Eh, and dissolved oxygen.

The petition to cease operation of the groundwater treatment system shall include monitoring of the water quality in the aquifer after treatment has been temporarily stopped. This temporary shutdown of the system shall be sufficiently long as is necessary to allow the 3dimensional groundwater flow system and chemical equilibrium to attain the steady-state condition which will exist when groundwater remediation has ceased. At a minimum, a series of samples taken at time after shutdown intervals of 1 hour, 1 day, 1 week, and approximately 60 days are required. The Respondents shall maintain the temporary shutdown of the treatment system for no more than 60 days. The Respondents shall restart the groundwater treatment system and continue its operation until a petition to cease operation is approved in writing by U.S. EPA.

U.S. EPA will consider the groundwater to have achieved the performance standard if the distribution of these data show that the 95% one-sided confidence interval of the arsenic concentration for the last 24 months at each selected monitoring point is equal to or less than the groundwater performance standard. See U.S. EPA Guidance "Methods for Evaluating the Attainment of Cleanup Standards, Volume 2: Ground Water", and any amendment to that guidance. Upon U.S. EPA's approval of the petition to cease operation, Respondents may terminate the groundwater treatment system.

D. Notification of Temporary Shutdown of the Groundwater Treatment System

For any interruption of any portion of the groundwater treatment system, Respondents shall describe the nature and cause of the interruption, the length of time of the interruption, and measures that have been taken to prevent further shutdowns in Respondents' next scheduled progress report. If for any reason during the operation of the groundwater treatment system, the operation of any portion is interrupted or stopped for a period of 24 hours or more, whether due to mechanical failure, human error, or any other reason (except for scheduled maintenance), the Respondents shall notify U.S. EPA and MDNR within 24 hours after learning of such interruption or cessation of operation. Notification shall include information on the nature and cause of the interruption or cessation as well as the estimated time before operation of the system shall resume. The Respondents also shall notify U.S. EPA and MDNR upon reactivation of the system. In cases where cessation of operation exceed two weeks, Respondents shall provide progress

reports to U.S. EPA periodically by telephone or in writing addressing measures being taken to repair, complete maintenance, or other steps taken to timely resume operation.

The Respondents shall notify U.S. EPA and MDNR of scheduled maintenance that requires shut down of any portion of the groundwater treatment system as soon as such maintenance has been scheduled. Notification shall include providing information on scope and extent of work, estimated down time of the system, and contingency plans for unexpected problems or schedule delays.

In all cases where there is an interruption or cessation in the operation of any portion of the groundwater treatment system, whether due to mechanical failure, human error, or to perform routine maintenance, as well as any other reason, the Respondents shall use their best efforts to repair, complete maintenance, or take any other steps necessary to timely resume the operation of the system.

E. Correction of Deficiencies

If U.S. EPA, upon review of monitoring data and other information, determines that the treatment system is insufficient such that (a) (a) the arsenic concentration in groundwater is not decreasing at the rate necessary to achieve the performance standard sufficient to meet the time estimate in the Record of Decision, or (b) adverse hydrologic consequences are occurring, U.S. EPA, after opportunity for comment by the MDNR, may require changes in the treatment system to correct any deficiencies. Examples of such changes include, but are not limited to, changes in numbers or locations of groundwater treatment wells and/or changes in the rate of addition of oxidants to the aquifer. Upon determination of a deficiency, Respondents shall submit a work plan for the additional response actions no later than 30 days after receipt of written notice from U.S. EPA, unless an active drinking water well is affected, in which case Respondents shall initiate appropriate corrective action as soon as possible after oral notice is received from U.S. EPA, which shall then be followed by written notice as soon as practicable. The work plan shall include a detailed description of measures which the Respondents will take to correct the treatment system, a schedule for each major activity and for submission of deliverables generated during the action, including specific dates for completion of the project.
The work plan shall include any revisions to the QAPP, Site Health and Safety Plan, and Field Sampling Plan needed for the action. Upon approval of the work plan, the Respondents shall implement the work plan in accordance with the schedule contained therein.

If any of the groundwater treatment wells are destroyed or in any way become unusable, the Respondents shall repair or replace each such well to the extent practicable. The location of any additional wells installed pursuant to the UAO or this SOW shall be

approved by the U.S. EPA.

F. Post-Shutdown Monitoring and Restart

After discontinuing operation of the groundwater treatment system pursuant to Subpart 6C, above, the Respondents shall thereafter perform annual monitoring of each well listed in Table 1, in order to verify that the groundwater performance standard is being maintained. Upon written approval of U.S. EPA, in consultation with MDNR, Respondents may decrease the number of wells for post-shutdown monitoring. Post-shutdown sampling shall include arsenic, ammonia, pH, Eh, dissolved oxygen, aluminum, antimony, benzene, cobalt, 1,2-Dibromo-3-chloropropane, manganese, nickel, and vinyl chloride (i.e., constituents previously found above Michigan Act 307 Type B levels in groundwater at the site), and any other parameters identified in the approved RD. Such monitoring shall continue until the Respondents demonstrate that the performance standard established in the ROD and SOW have been continuously satisfied for five years following final shutdown of the groundwater treatment system.

If post-shutdown groundwater monitoring indicates that the 95% one-sided confidence interval of arsenic's concentration at any selected monitoring point has increased above the groundwater performance standard after groundwater treatment has been terminated in accordance with Subpart 6C, above, the Respondents shall reactivate the groundwater treatment system. If the Respondents are required to reactivate the system, the Respondents shall thereafter operate and maintain the groundwater treatment system until they again demonstrate compliance with the groundwater performance standard as provided in Subpart 6A and the shutdown requirements of Subpart 6C.

III. SCOPE OF REMEDIAL DESIGN AND REMEDIAL ACTION

The Remedial Design/Remedial Action shall consist of nine tasks. All plans are subject to EPA approval.

Task 1: Remedial Design Work Plan

Task 2: Pre-design Studies

Task 3: Remedial Design

Task 4: Remedial Action Work Plan

Task 5: Remedial Action Construction

Task 6: Contingent Remedy

Task 7: Operation and Maintenance

Task 8: Performance Monitoring

Task 9: Remedial Action Completion

Unless otherwise specified by U.S. EPA, Respondents shall provide two copies of all submittals to the U.S. EPA Remedial Project Manager, two copies to the U.S. EPA oversight contractor, and two copies to the MDNR project coordinator. One of the two copies sent to U.S. EPA and the MDNR must be unbound. For Monthly Progress Reports, one copy should be sent to U.S. EPA and one copy to the State. Respondents shall comply with all Plans submitted with the Remedial Design, and shall comply with the Final Project Schedule established in the Remedial Design.

As specified in Section XV of the UAO, within 15 days after the effective date of the UAO, Respondents shall notify U.S. EPA in writing of the name, title, and qualifications of any contractor proposed to be the Project Coordinator for implementation of the UAO. Following this notification, U.S. EPA will issue a notice of disapproval or an authorization to proceed. If instead the supervising function is to be performed by a Respondent, Respondents will notify U.S. EPA of his or her name and title.

Task 1: Remedial Design Work Plan

The Respondents shall submit a Remedial Design (RD) Work Plan which shall document the overall management strategy for performing the design, for U.S. EPA review and approval. The plan shall document the responsibility and authority of all organizations and key personnel involved with the implementation and shall include a description of qualifications of key personnel directing the RD, including contractor personnel. The plan shall also contain a schedule of all RD activities, including pre-design field work, Pre-design Studies Report and design submittals. The Respondents shall submit a RD Work Plan in accordance with Section VII of the UAO and Section V of this SOW.

In addition to the overall management strategy and schedule, the RD Work Plan also include the following:

1. Quality Assurance Project Plan (QAPP);
2. Site Health and Safety Plan;
3. Field Sampling Plan;
4. Plans for installation of additional groundwater monitoring wells and gas emissions studies;
5. Plans for completing any site access not previously obtained;
6. Plans for obtaining restrictive covenants for groundwater; and
7. Plans for assisting U.S. EPA in community involvement when requested by U.S. EPA.

The QAPP, Site Health and Safety Plan, and Field Sampling Plan shall cover all pre-design and design tasks, and to the extent possible, shall accommodate the Remedial Action as well, so that minimal revision is needed prior to construction. These plans shall include each of the elements listed in Section IV of this SOW.

In the plans for completing site access, Respondents shall use best efforts, consistent with Section XVI of the UAO, to secure site access for the Respondents, the United States and its representatives, as necessary to effectuate the UAO, including the payment of reasonable sums of money in consideration of access.

Task 2: Pre-design Studies

This Remedial Action requires pre-design studies to supplement the available technical data. These pre-design studies include, but are not limited to:

1. Native species revegetation study;
2. Gas emissions study;
3. Installation of four additional monitoring wells;
4. Groundwater sampling

The Respondents shall evaluate the costs and practicability of revegetating the landfill cap with native species, and evaluate gas emissions from the landfill, as described on page 25 of the ROD and page 3 of this SOW. The Respondents also shall install new monitoring wells, and sample new and existing wells, as described on page 26 of the ROD and page 4 of this SOW.

The Respondents shall implement the pre-design studies in accordance with the final RD Work Plan. The results of the pre-design studies shall be submitted in a Pre-design Studies Report which shall be submitted within the schedule approved in the final RD Work Plan.

Task 3: Remedial Design

Respondents shall prepare construction plans and specifications to implement the Remedial Actions at the Site as described in the ROD and this SOW. Plans and specifications shall include each of the items listed in Section IV of this SOW and shall be submitted in accordance with the schedule set forth in Section V below. Subject to approval by U.S. EPA, Respondents may submit more than one set of design submittals reflecting different components of the Remedial Action. All plans and specifications shall be developed in accordance with U.S. EPA's Superfund Remedial Design and Remedial Action Guidance (OSWER Directive No. 9355.0-4A) and shall demonstrate that the Remedial Action shall meet all objectives of the ROD, the UAO and this SOW, including all performance standards. Respondents shall meet regularly with U.S. EPA to discuss design

issues.

A. Preliminary Design

Respondents shall submit the Preliminary Design when the design effort is approximately 30 % complete. The Preliminary Design submittal shall include or discuss, at a minimum, the following:

- Preliminary plans, drawings, and sketches, including design calculations;
- Design assumptions and parameters, including design restrictions, process performance criteria, appropriate unit processes for the treatment train, and expected removal or treatment efficiencies for both the process and waste (concentration and volume);
- Proposed cleanup verification methods, including compliance with Applicable or Relevant and Appropriate Requirements (ARARs);
- Outline of required specifications;
- Proposed siting/locations of processes/construction activity;
- Expected long-term monitoring and operation requirements;
- Real estate, easement, and permit requirements;
- Preliminary construction schedule, including contracting strategy.
- Draft Performance Monitoring Plan;
- Draft Construction Quality Assurance Plan;
- Draft Contingency Plan (unless included in Site Health and Safety Plan)

B. Intermediate Design Meeting

When the design is approximately 60% complete, Respondents shall notify U.S. EPA and MDNR for the purpose of scheduling an intermediate design meeting. At this meeting, Respondents shall present an overview of the current status of the design and present any design issues which should be brought to the attention of U.S. EPA.

C. Final Design

Respondents shall submit the Final Design when the design effort is

100% complete. The Final Design shall fully address all comments made to the preceding design submittal. The Final Design shall include reproducible drawings and specifications suitable for bid advertisement. The Final Design shall include those elements listed for the Preliminary Design, as well as, the following:

- Final Performance Monitoring Plan;
- Final Construction Quality Assurance Plan;
- Final Contingency Plan (unless included in Site Health and Safety Plan)
- Draft Operation and Maintenance Plan;
- Capital and Operation and Maintenance Cost Estimate.

The Respondents shall review the Draft Operation and Maintenance Plan following construction and shall submit a Final Operation and Maintenance Plan to U.S. EPA no later than the date of the Pre-final Construction Inspection.

Task 4: Remedial Action Work Plan

The Respondents shall submit a Remedial Action (RA) Work Plan which includes a detailed description of the remediation and construction activities. The RA Work Plan shall include a project schedule for each major activity and submission of deliverables generated during the Remedial Action, including specific dates for completion of the project. The Respondents shall submit a RA Work Plan in accordance with § XII and Paragraph 36 of the UAO and Section V of this SOW.

The RA Work Plan shall include as attachments an RA QAPP and an RA Site Health and Safety Plan. The RA Work Plan shall also include any revisions to the Field Sampling Plan needed for Remedial Action.

If some or all of the RA is to be performed by contractor(s), the RA Work Plan shall include plans to provide U.S. EPA with copies of all bid specifications, if they have not been provided previously. The RA Work Plan shall also include a schedule for the Respondents' pre-bid meeting, bid review, and contract award.

Task 5: Remedial Action Construction

The Respondents shall implement the Remedial Action as detailed in the approved Final Design and approved Remedial Action Work Plan. The following activities shall be completed in constructing the Remedial Action.

A. Preconstruction inspection and meeting:

The Respondents shall participate with the U.S. EPA and the Michigan Department of Natural Resources (MDNR) in a preconstruction inspection and meeting to:

a. Review methods for documenting and reporting inspection data;

b. Review methods for distributing and storing documents and reports;

c. Review work area security and safety protocol;

d. Discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed; and,

e. Conduct a Site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person and minutes shall be transmitted to all parties.

B. Prefinal Construction Inspection:

Within 30 days after Respondents make a preliminary determination that construction is complete, the Respondents shall notify the U.S. EPA and the MDNR for the purposes of conducting a prefinal construction inspection. The prefinal construction inspection shall consist of a walk-through inspection of the entire Facility with U.S. EPA and the MDNR. The inspection is to determine whether the project is complete and consistent with the contract documents and the Remedial Design. Any outstanding construction items discovered during the inspection shall be identified and noted. Additionally, treatment equipment, if any, shall be operationally tested by the Respondents. The Respondents shall certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting shall be completed where deficiencies are revealed.

C. Final Construction Inspection:

Within 15 days after completion of any work identified in the prefinal construction inspection report, the Respondents shall notify the U.S. EPA and the MDNR for the purposes of conducting a final construction inspection. The final construction inspection shall consist of a walk-through inspection of the Facility by U.S. EPA and the Respondents. The prefinal construction inspection report shall be used as a checklist with the final construction inspection focusing on the outstanding construction items identified in the prefinal construction inspection. At the final

construction inspection, Respondents shall confirm that outstanding items have been resolved.

1. Prefinal Construction Inspection Report

Within 15 days of the prefinal construction inspection, the Respondents shall submit a Prefinal Construction Inspection Report which outlines the outstanding construction items, actions required to resolve outstanding items, completion dates for these items, and includes a proposed date for the final construction inspection. The Prefinal Construction Inspection Report may be submitted in the form of a punch list or a letter.

2. Final Construction Report

Within 30 days of a successful final construction inspection, Respondents shall submit a Final Construction Report. In the report, a registered professional engineer and the Respondents' Project Coordinator shall state that the Remedial Action has been constructed in accordance with the design and specifications. The Final Construction Report shall contain the following statement, signed by a responsible corporate official of a Respondent or the Respondents' Project Coordinator:

> "To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

The final construction report shall include, but not be limited to, the following elements:

a. Chronology of events;

b. Summary of Performance Standards and Construction Quality Control;

c. Summary of construction activities;

d. Summary of final construction inspection;

e. Certification of the design and construction;

f. As-built drawings signed and stamped by a professional engineer;

g. Explanation of any modifications to the Remedial Design and why these were necessary for the project;

h. Certification that the remedy is functioning properly and

is performing as designed;

i. Explanation of operation and maintenance, including monitoring, to be undertaken at the site and any changes required based on modification of site plans during construction; and

j. Summary of project costs.

Task 6: Contingent Remedy

If so directed by U.S. EPA, in consultation with the MDNR, the Respondents shall implement all tasks applicable to the contingent remedy, as specified on pages 26 through 28 of the ROD.

A. Contingent Remedy Groundwater Monitoring Report

No earlier than 58 months and no later than 60 months following the Respondents' submittal of the final construction report, the Respondents shall submit a Contingent Remedy Groundwater Monitoring Report. This report shall include results of a statistical test on each monitoring well in which the arsenic concentration exceeded 0.05 mg/l during any sampling event. For each such well, Respondents shall submit a time plot of arsenic concentration over the five year period. For those wells at which a downward trend is present, Respondents shall use a regression, time series, or other model approved by U.S. EPA, to predict the date at which arsenic concentrations will meet 0.05 mg/l arsenic, assuming that the observed trend continues. If the data do not exhibit serial correlation, Respondents shall use a regression model to estimate a linear or nonlinear trend for the subset of data which represent a downward trend. If the data do exhibit serial correlation, Respondents shall use a time series model in lieu of a regression model on the same subset of data. Another method may be used if approved by U.S. EPA.

B. Work Plan, Pilot Testing, and Design of Groundwater Treatment System

Within 60 days after notification from U.S. EPA that the contingent remedy must be implemented, the Respondents shall submit a Work Plan for Groundwater Treatment. The plan shall document the overall management strategy for performing the pilot testing, design, construction, and operation of the treatment system, for U.S. EPA review and approval. The plan shall document the responsibility and authority of all organizations and key personnel involved with the implementation and shall include a description of qualifications of key personnel, including contractor personnel.

The Work Plan for Groundwater Treatment also must include the following items:

a. Detailed plans for pilot testing and a schedule for submittal of a Pilot Testing Report for Groundwater Treatment;

b. A schedule for submittal of Preliminary and Final Design for Groundwater Treatment;

c. A preliminary schedule for a pre-construction meeting, pre-final and final inspections, Completion of Construction Report, and Completion of Work Report.

d. Plans and schedule for selection of contractor; and

e. Construction schedule, including completion of construction.

The Work Plan for Groundwater Treatment shall also include any necessary updates to the approved Quality Assurance Project Plan (QAPP), Site Health and Safety Plan, and Field Sampling Plan. The plan shall also include any additional plans for site access which are necessary for the contingent remedy.

Upon U.S. EPA approval of the Work Plan for Groundwater Treatment, Respondents shall conduct Pilot Studies to determine whether air or another oxidant is most suitable for the site and to assist with design of the system. Respondents shall submit a Pilot Studies Report, a Preliminary Design and a Final Design within the schedule approved in the Work Plan.

The Preliminary and Final Design shall include each of the items listed under Task 3 of this SOW, unless notified in writing by U.S. EPA that certain elements are not necessary.

C. Construction of Groundwater Treatment System

Within 90 days of U.S. EPA approval of the Final Design, Respondents shall award contract(s) for the groundwater treatment system. Respondents shall initiate and complete construction of the groundwater treatment system within the schedule approved in the Work Plan for Groundwater Treatment.

Upon completion of construction of the groundwater treatment system, the Respondents shall complete each of the items listed under Task 5 as they apply to the groundwater treatment system, including notification of U.S. EPA for pre-final and final construction inspections and submittal of pre-final and final construction reports.

Task 7: Operation and Maintenance

The Respondents shall prepare an Operation and Maintenance (O&M) Plan to cover both implementation and long term maintenance of the Remedial Actions. An initial Draft O&M Plan shall be submitted as a final Design Document submission. The final O&M Plan shall be

submitted to U.S. EPA prior to the pre-final construction inspection, in accordance with the approved construction schedule. The plan shall be composed of the following elements:

1. Description of normal operation and maintenance ;

    a. Description of tasks for operation;
    b. Description of tasks for maintenance;
    c. Description of prescribed treatment or operation conditions; and
    d. Schedule showing frequency of each O&M task.

2. Description of potential operating problems;

    a. Description and analysis of potential operation problems;
    b. Sources of information regarding problems; and
    c. Common and/or anticipated remedies.

3. Description of routine monitoring and laboratory testing;

    a. Description of monitoring tasks;
    b. Description of required data collection, laboratory tests and their interpretation;
    c. Required quality assurance, and quality control ;
    d. Schedule of monitoring frequency and procedures for a petition to U.S. EPA to reduce the frequency of or discontinue monitoring; and
    e. Description of verification sampling procedures if cleanup or performance standards are exceeded in routine monitoring.

4. Description of alternate O&M;

    a. Should systems fail, alternate procedures to prevent release or threatened releases of hazardous substances, pollutants or contaminants which may endanger public health and the environment or exceed performance standards; and
    b. Analysis of vulnerability and additional resource requirement should a failure occur.

5. Corrective Action;

    a. Description of corrective action to be implemented in the event that cleanup or performance standards are exceeded; and
    b. Schedule for implementing these corrective actions.

6. Safety plan;

    a. Description of precautions, of necessary equipment, etc.,

for Site personnel; and
b. Safety tasks required in event of systems failure.

7. Description of equipment; and

a. Equipment identification;
b. Installation of monitoring components;
c. Maintenance of Site equipment; and
d. Replacement schedule for equipment and installed components.

8. Records and reporting mechanisms required.

a. Daily operating logs;
b. Laboratory records;
c. Records for operating costs;
d. Mechanism for reporting emergencies;
e. Personnel and maintenance records; and
f. Monthly/annual reports to State agencies.

Task 8: Performance Monitoring

Respondents shall implement performance monitoring as approved in the Remedial Design to ensure that all performance standards are met. The performance monitoring program shall assess the performance of drum removal and treatment, construction of landfill cap and landfill gas collection system, groundwater monitoring program, and, if implemented, the groundwater treatment system. In the monthly progress reports required under Section XI of the UAO, Respondents shall submit details concerning progress toward attainment of performance standards for each remedial action task which is in progress.

If requested by U.S. EPA pursuant to Section VIII of the UAO, the Respondents shall conduct any additional investigations and shall submit any additional reports required by U.S. EPA in order to permit U.S. EPA to meet the five-year review requirements of Section 121(c) of CERCLA and applicable regulations.

Task 9: Remedial Action Completion

A. Completion of Remedial Action

After receiving notice from U.S. EPA that either a) the contingent remedy will not be invoked, or b) a petition to cease operation of the groundwater treatment system has been approved, Respondents shall assess the Remedial Action to determine whether all performance standards have been attained. Within 90 days of Respondents' assessment that performance standards have been attained and Remedial Action is fully performed except for long-term groundwater monitoring and operation and maintenance of the landfill, Respondents shall notify U.S. EPA and the MDNR for the

purpose of conducting a pre-certification inspection for completion of remedial action.

Within 30 days of a successful final inspection, Respondents shall submit a Completion of Remedial Action Report. The written report shall include as-built drawings signed and stamped by a professional engineer for any construction changes or any construction not included in the Final Construction Report. The Completion of Remedial Action Report shall contain the following statement, signed by a responsible corporate official of a Respondents or the Respondents' Project Coordinator:

> "To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

B. Completion of Work

Within 90 days of Respondents' assessment that all phases of work at the site are complete, except for long-term operation and maintenance of the landfill, Respondents' shall notify U.S. EPA and the MDNR for the purpose of conducting a pre-certification inspection for completion of work.

Within 30 days of completion of all groundwater monitoring required by the ROD, UAO and this SOW, Respondents shall submit a Completion of Work Report. In the report, a registered professional engineer and the Respondents' Project Coordinator shall state the Remedial Action has been completed in full satisfaction of the requirements of this UAO. The written report shall include as-built drawings signed and stamped by a professional engineer not previously submitted. The report shall contain the statement listed under Task 9A above.

IV CONTENT OF SUPPORTING PLANS

The documents listed in this section -- the Quality Assurance Project Plan, the Field Sampling Plan, the Health and Safety Plan, the Contingency Plan and the Construction Quality Assurance Plan -- are documents which must be prepared and submitted as outlined in Section III of this SOW. The following section describes the required contents of each of these supporting plans.

Because similar tasks may be performed at different points in the Remedial Action, e.g., with respect to implementation of the contingent remedy, a single QAPP, a single Health and Safety Plan (and Contingency Plan), a single Field Sampling Plan, a single Construction Quality Assurance Plan, may be prepared. These

documents, however, may be supplemented to reflect successive tasks. Such amendments shall be approved by U.S. EPA, in consultation with MDNR, and shall be submitted to U.S. EPA as addenda to the original plans.

A. Quality Assurance Project Plan

The Respondents shall develop a Site specific Quality Assurance Project Plan (QAPP), covering sample analysis and data handling for samples collected in all phases of future Site work, based upon the UAO and guidance provided by U.S. EPA. The QAPP shall be consistent with the requirements of the EPA Contract Lab Program (CLP) for laboratories proposed outside the CLP. The Region 5 model QAPP will be provided to the Respondents to facilitate preparation of the QAPP. The QAPP shall at a minimum include:

Project Description
- * Facility Location History
- * Past Data Collection Activity
- * Project Scope
- * Sample Network Design
- * Parameters to be Tested and Frequency
- * Project Schedule

Project Organization and Responsibility

Quality Assurance Objective for Measurement Data
- * Level of Quality Control Effort
- * Accuracy, Precision and Sensitivity of Analysis
- * Completeness, Representativeness and Comparability

Sampling Procedures

Sample Custody
- * Field Specific Custody Procedures
- * Laboratory Chain of Custody Procedures

Calibration Procedures and Frequency
- * Field Instruments/Equipment
- * Laboratory Instruments

Analytical Procedures
- * Non-Contract Laboratory Program Analytical Methods
- * Field Screening and Analytical Protocol
- * Laboratory Procedures

Internal Quality Control Checks
- * Field Measurements
- * Laboratory Analysis

Data Reduction, Validation, and Reporting
* Data Reduction
* Data Validation
* Data Reporting

Performance and System Audits
* Internal Audits of Field Activity
* Internal Laboratory Audit
* External Field Audit
* External Laboratory Audit

Preventive Maintenance
* Routine Preventative Maintenance Procedures and Schedules
* Field Instruments/Equipment
* Laboratory Instruments

Specific Routine Procedures to Assess Data Precision,
Accuracy, and Completeness
* Field Measurement Data
* Laboratory Data

Corrective Action
* Sample Collection/Field Measurement
* Laboratory Analysis

Quality Assurance Reports to Management

The Respondents shall attend a pre-QAPP meeting with U.S. EPA. The Respondents shall submit a draft QAPP to U.S. EPA for review and approval.

B. Site Health and Safety Plan

The Respondents shall develop a health and safety plan which is designed to protect on-site personnel and area residents from physical, chemical and all other hazards posed by this remedial action. The safety plan shall develop the performance levels and criteria necessary to address the following areas.

Facility Description
Personnel
Levels of protection
Safe work practices and safe guards
Medical surveillance
Personal and environmental air monitoring
Personal protective equipment
Personal hygiene
Decontamination - personal and equipment
Site work zones
Contaminant control

Contingency and emergency planning
Logs, reports and record keeping

The safety plan shall follow U.S. EPA guidance and all OSHA requirements as outlined in 29 CFR 1910 and 1926.

Contingency Plan

Respondents shall submit a Contingency Plan (stand-alone or in Health and Safety Plan) describing procedures to be used in the event of an accident or emergency at the site. The draft Contingency Plan shall be submitted with the prefinal design and the [draft] final Contingency Plan shall be submitted with the final design. [The final Contingency Plan shall be submitted prior to the start of construction, in accordance with the approved construction schedule.] The Contingency Plan shall include, at a minimum, the following:

1. Name of the person or entity responsible for responding in the event of an emergency incident.

2. Plan and date(s) for meeting(s) with the local community, including local, State and Federal agencies involved in the cleanup, as well as local emergency squads and hospitals.

3. First aid medical information.

4. Air Monitoring Plan (if applicable).

5. Spill Prevention, Control, and Countermeasures (SPCC) Plan (if applicable), as specified in 40 CFR Part 109 describing measures to prevent and contingency plans for potential spills and discharges from materials handling and transportation.

C. Field Sampling Plan

The Respondents shall develop a field sampling plan (as described in " Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," October 1988). The Field Sampling Plan should supplement the QAPP and address all sample collection activities.

D. Construction Quality Assurance Plan

Respondents shall submit a Construction Quality Assurance Plan (CQAP) which describes the Site specific components of the quality assurance program which shall ensure that the completed project meets or exceeds all design criteria, plans, and specifications. The draft CQAP shall be submitted with the prefinal design and the [draft] final CQAP shall be submitted with the final design. [The final CQAP shall be submitted prior to the start of construction in accordance with the approved construction schedule.] The CQAP

shall contain, at a minimum, the following elements:

1. Responsibilities and authorities of all organizations and key personnel involved in the design and construction of the Remedial Action.

2. Qualifications of the Quality Assurance Official to demonstrate he possesses the training and experience necessary to fulfill his identified responsibilities.

3. Protocols for sampling and testing used to monitor construction.

4. Identification of proposed quality assurance sampling activities including the sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation. A description of the provisions for final storage of all records consistent with the requirements of the unilateral Administrative Order shall be included.

5. Reporting requirements for CQA activities shall be described in detail in the CQA plan. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation. Provisions for the final storage of all records shall be presented in the CQA plan.

V. SUMMARY OF MAJOR DELIVERABLES/SCHEDULE

A summary of the project schedule and reporting requirements contained in this SOW is presented below:

Submission		Due Date
1.	Notify U.S. EPA of Project Coordinator	Within 15 days of effective date of the UAO
2.	RD Work Plan	Sixty (60) days after the effective date of the UAO
3.	Pre-design Studies Report	As approved in the RD Work Plan
4.	Preliminary Design (30%)	Forty-five (45) days after U.S. EPA's approval of Pre-design Studies Report
5.	Intermediate Design Meeting (60%)	Thirty (30) days after receipt of U.S. EPA's comments on the Preliminary Design
6.	Final Design (100%)	Thirty (30) days after Intermediate Design Meeting
7.	RA Work Plan	Thirty (30) days after approval of Final Design
8.	Award Construction Contract(s)	Thirty (30) days after approval of RA Work Plan
9.	Pre-Construction Inspection and Meeting	Fifteen (15) days after Award of RA Contract(s)
10.	Initiate Construction of RA	Fifteen (15) days after Pre-Construction Inspection and Meeting
11.	Completion of Construction	As approved by U.S. EPA in RA Work Plan
12.	Prefinal Construction Inspection	Thirty (30) days after Respondents' assessment that construction is complete
13.	Final O&M Plan	No later than Prefinal

		Construction Inspection
14.	Prefinal Construction Inspection Report	Fifteen (15) days after Prefinal Construction Inspection
15.	Final Construction Inspection	Fifteen (15) days after completion of work identified in Prefinal Construction Inspection Report
16.	Final Construction Report	Thirty (30) days after Final Construction Inspection
17.	Contingent Remedy Groundwater Monitoring Report	58 to 60 months after Respondents' submittal of Final Construction Report

Items 18 through 23 will be due only if the Contingent Remedy is required:

18.	Work Plan for Groundwater Treatment	Sixty (60) days after notice that Contingent Remedy is required
19.	Pilot Studies Report for Groundwater Treatment	As approved in Work Plan for Groundwater Treatment
20.	Preliminary Design for Groundwater Treatment	As approved in Work Plan for Groundwater Treatment
21.	Final Design for Groundwater for Treatment	As approved in Work Plan for Groundwater Treatment
22.	Award RA Contract for Groundwater Treatment	Ninety (90) days after U.S.EPA approval of Final Design
23.	Initiate/Complete Construction	As approved in Work Plan for Groundwater Treatment
24.	Construction Inspections and Construction Reports for Groundwater Treatment	As specified in Task 5 of this SOW
25.	Pre-certification Inspection For Completion of RA	Ninety (90) days from Respondents' assessment that Remedial Action is fully performed and performance standards